mint Valley, Cal. I have also seen specimens from Mexico (Sumichrast), near Mescico, Mex. (Palmer), and from Jalapa, Orizaba and Menanitlan, Mex. (L. Bruner).

Nemobius carolinus.

Nemobius carolinus SCUDDER! Proc. Bost. Soc. Nat. Hist. XIX, 36 (1877).
Cyrtoxiphus variegatus BRUNER! Publ. Nebr. Acad. Sc. III, 32 (1893).
Nemobius affinis BEUTENMULLER! Bull. Amer. Mus. Nat. Hist. VI, 249, 267, Pl. 5, fig. 11 (1894).

No macropterous form is known. There is considerable variation, apparently independent of locality, in the fineness of the denticulation of the blades of the ovipositor.

Specimens before me come from Jackman, Me. (Harvey—A. P. Morse), Norway, Me. (Smith—Mus. Comp. Zool.), Blue Hill, Milton, Mass. Sept. (S. Henshaw), Adams, Mass. (Morse), South Kent and Canaan, Conn., (Morse), New York (Beutenmuller), Ithaca, N. Y. (Morse), Orange, N. J., (Beutenmuller), Maryland (Uhler), Vigo Co., Ind. (Blatchley), District of Columbia and Virginia (Bruner), North Carolina (Morrison, Henshaw), Lake Worth, Fla. (Mrs. Slosson), Lake Okeechobee, Fla. Palmer), New Orleans, La , (Shufeldt—U. S. Nat. Mus.), Texas (Boll), Texas "Flying to light" (Belfrage), Lincoln, West Point and South Bend, Nebr. (Bruner).

IMPRESSIONS RECEIVED FROM A STUDY OF OUR NORTH AMERICAN RHOPALOCERA.

By HENRY SKINNER, M. D.

I wish to speak of specific values—a subject which has always agitated the scientific mind, and perhaps always will in the future. My excuse for writing on such a subject is the fact that I believe the proper kind of studies will enable us to approximate an absolute specific value, or at least get much nearer the truth than is now shown by a study of our catalogues and lists of species. I do not care to go into the trite subject as to what is a species, but think it only fair to give my own view, or that which I should follow in the rearrangement of our species. I look upon the species as the unit of classification, and therefore it is all important to have the basis of classification as scientifically accurate as possible. I would divide the definition of species into two heads:

First, the morphological, or groups of individuals more or less alike in appearance, form, structure or color; second, the physiological, or those forms of life capable of producing fertile offspring among themselves. A species based on the morphological part of our definition I hold to be purely tentative (as we must apply the physiological part of the definition before we can be absolutely sure we have a valid species, but unfortunately it is only seldom, or after the lapse of much time, that specific value is capable of such proof). Now, my idea is that instead of relying to too great an extent on morphological differences we could fix the value of those modifications by analogy or comparative value. That is, if I should say that certain species (and giving a list, say of 25) represent my idea of specific value, I think students would get a better idea of what I meant than if I should spill any amount of ink in definitions and controversies. On the other hand, I could give a list of so-called species that did not represent my idea of true specific value. I can give a better idea of my meaning on this subject when I come to compare the value of our species and when I refer to them as now listed. Our species were described by a number of authors, and therefore represent to a large extent many individual ideas. However, our last Catalogue (that of 1884, by Mr. W. H. Edwards) gives the list of species according to the best knowledge and belief of our foremost student of the diurnals.

I shall speak of the great variation in insects and say something of its causes, especially in the Lepidoptera. Some of our writers seem to have ignored absolutely the lessons these variations teach, especially when describing species. We have been so busy describing species and doing systematic work in this country that we have not had time to look into those interesting biological problems that have received so much attention abroad. There are many things which influence variation in the Lepidoptera which are more or less well known, but this knowledge has not been sufficiently applied in describing species, or perhaps in some cases has been ignored. The principal causes which bring about variation are different geological formations and soils; different foods; season; climatic conditions; horizontal and vertical distribution or what might be called longitude and latitude; altitude which produces apparently the same effect as vertical distribution. These causes may all be covered in a general way by calling them the effects produced by geographical distribution. Heat and cold may act locally at different times or is in other cases a factor in vertical distribution. "Succulent overgrown herbage produces large pale colored im-

agos, while dry semi-withered food produces dark imagos of small size. Heat accelerates the pupal stage and cold retards it and the effect is shown in the imagos. The character of the season influences the resulting imagos and also the number of broods. Sometimes species which are usually single brooded may in special season become double brooded, and those which are normally double brooded may produce an additional brood. The individuals of these different broods differ and in some cases to such an extent as to have been described as different species. Nearly, if not all, butterflies produced from wintering chrysalids are different in appearance from the subsequent summer brood or broods. *Pieris napi* and *rapæ* are whiter with the blackish markings nearly obsolete. *Papilio turnus* from wintering chrysalids in this locality look like the Arctic form. Species of *Lycæna* in their spring dress are very different from those produced later. Even what might be called anatomical differences are produced by season; thus in some of the Lycænidæ the spring brood is tailless, whilst the summer generation of the same insect is provided with these appendages.

In passing from the sub-tropical heat of the Rhone Valley through successive zones which are to be met with before reaching the perennial snows of the Gorner Grat and the peaks overhanging the Riffel, a collection of insects may be made which represents in temperature a difference of latitude as great as from Italy to Scandinavia. I am quite positive that if studies were made from large amounts of material from different localities the observing student would soon learn to tell from whence a given specimen of a species came, from its appearance alone. This is specially true of forms having a wide geographical range.

In *Anthocharis belia* by prolongation of the pupal stage we get var. *ausonia* which has the underwings (underside) white with yellowish green blotches, instead of being green with silvery spots. The spring brood of *Vanessa antiopa* has whitish wing borders instead of buff. In Holland a pale yellow border, and in Sweden, Norway and Lapland have white borders throughout the year. The same species from Pennsylvania can be distinguished from California examples, the latter being more nearly related to the European form. *Lycæna agestis*, a well known little brown butterfly, with a marginal row of rich orange spots, common in the south of England during May and August, when producing but a single annual brood, appears in July as a variety (*artaxerxes*) that presents the black spots on the wings replaced by white ones, and which was for a long time on that account regarded as a distinct species.

It has become an established fact that those color-bands with charming ocellated spots that so enhance butterfly kind, should everywhere vary, and in certain localities vanish; and many drab and brown wings fluttering among grass and shade, and from time to time have exhibited hillsman's spots that have caused a cry of new species, or prompted experts to enter on description where others see but variety. The large Heath Butterfly may be reckoned among these. This kind in the north of England at an elevation of two thousand feet, according to Mr. T. Marshall, and in some parts of Ireland, according to Mr. Birchall, has the eyes painted on its sandy wings greatly decreased in number; and on the Perthshire Mountains, conjointly with the English type, an aberration is sometimes seen even less ocellated, and this anomaly we find has established itself in Lapland as the local form *isis* of the species, the most boreal variation. Our species are said to be darker than the same or allied forms in Europe.

It has frequently been noticed that in the mountains of Europe, as well as in this country, that as we ascend the butterfly becomes smaller and darker and their sexes often lose the color differentiation. Woody coverts and proximity to the sea, as also the smoke of towns and manufacturing districts, are associated with variety and melanism. The system of variation in such localities is the same and the cause is constant, while external conditions of environment are multifarious. Thus the shades of New Forest afford a constant variety, *valesina* of *Argynnis paphia*, which instead of being fulvous is brown and spotted instead of streaked along the nervures; it will thus be noted that altitude produces much the same effect as shade." *Erebia blandina*, from Morecombe Bay, has the brown bands on the fore-wings replaced by yellow.

The Lepidoptera at Hastings and on the coast of Wales have been noticed as being often deviations from the types. On small islands butterflies have been considered to have enlarged wings, but it should then be noticed these islands lay far south in latitude, a consideration that might cause us to hesitate in accepting the premises on Darwin's explanatory theory that the larger wings are acquired from battling with the winds. "Species found in Japan have a much greater expanse than the individuals of the same species from Europe. Albinism is thought sometimes to be produced from light colored soils. Thus it is active on the English Chalk Downs, where it produces varieties in unstable genera of moths." The large Heath Butterfly is a very large insect (var. *typhon*) in Cumberland and Scotland on high hills; whilst

on low moss lands, on which water is charged with iodine, in Cumberland, Westmoreland and Lancashire, it is a rich fulvous brown insect, larger and stronger built; and when these are acted upon by hydrochloric acid gas they assume the exact color of the hill specimens. The dark Annulet moth (*Gnophos obscuraria*) on chalk lands is a light colored grey or drab insect. In carboniferous limestone districts it is a lead-colored insect, whilst on the New Red Sandstone formation it varies from a rich ochreous color where oxide of iron is present in the soil to a dark, almost black insect on the white sandstone parts of the New Red formation, thus clearly pointing to geologically caused changes of color. Any of these latter forms acted upon by chlorine appear as highly colored grays. The same remarks apply to *Dianthœcia carpophaga*. On chalk it is light buff; on "New Red" here, darker; but all buff in Cambrian at Llangollen; and at Penmaenbach darker still, buff or ochreous brown; and on quartoise early rock, rich dark cold grey-brown, as in the Isle of Man, and at the Howth, in Ireland, ochrey shades being rarely observable upon them; but, acted upon by hydrochloric acid gas they all turn to a beautiful bright light fawn buff, veritable *carpophaga* of the chalk.

It is to be observed, however, that some varieties we might be inclined to attribute to certain formations may be the result of a food proper to the soil. Thus in the cases of the Welsh Wave Moth (*Acidalia contiguaria*), bred continuously on heather from moss lands, all specimens become varieties, fumose specimens, whilst fed on succulent plants they are large light colored specimens, rarely darkish, but never so dark as when fed on heather from the moss. "We find seasonal varieties not alone alternating in ordinary years, but witness their production by fluctuations in annual temperatures. Thus while many butterflies produce one or two annual broods, in certain years, those ordinarily single brooded become double brooded; or those which are double brooded produce three annual generations."*

I now wish to apply some of these facts to our own Lepidoptera and wish to say in the beginning that want of exact localities and exact data on our specimens has been most pernicious and detrimental to all such studies. In many cases specimens are without localities or dates of capture or only have a State locality. Studies of variation produced by geographical variation in the broad sense indicated, or the effect produced by seasonal broods, are impossible without such data. I also wish

* I am indebted to Insect Variety, by A. H. Swinton, for these facts in relation to European Diurnals.

to condemn, in the most emphatic way, colored squares, silver or beautiful golden ones in the same way, and also numbers unless the absolute data and locality are also given. After many years lists which refer to numbers are lost, or the makers have not indicated on the lists what they mean, and many a time I have been driven frantic in looking over old collections. As a friend once said, God alone knows what they mean, and He won't tell. When I commenced my collection I was satisfied to have a single pair to represent the species, but now I cannot get enough individuals to represent all manner and kinds of variation brought about by natural causes. In the past I therefore knew this species or that, but now in many of our genera I nearly get brain fever in trying to determine where a species begins or ends.

In looking over our lists I would divide the species, so-called, into two classes, species and gradational or geographical forms. It should be remembered that most of our American entomologists were located in the Eastern part of the United States and were familiar with our Eastern species. When specimens were received from the West, more particularly the Pacific coast, it was of course seen that there was a difference between the Eastern and Western forms, especially where a few specimens were examined. This led to the description of new species (so-called), but there was a total ignorance of distribution, or what gradations or variations might be found between the extremes of localities. The same thing in a lesser degree occurs now. We are dependant upon specimens from localities where collectors accidentally happen to be, and our specimens (or species) show marked variations, in many cases due only to difference of locality. Nothing can be more pernicious than determining species from locality, yet some naturalists advocate this. The very fact that you determine a species by locality shows the whole weakness of such a procedure. What would be thought of a person who would describe a new species thus: Papilio humbugi differs from Papilio sp. by being found in Oregon, the latter flying in the vicinity of Philadelphia. This would be really better and indicate more than trying to describe minute geographical differences, and then really identifying the thing by difference in locality. I am positive that should some one go to work and hunt up the original descriptions of some of our species and find out the locality from whence came the types, and then get specimens representing the furthermost point of distribution and describe all these as new species, they would produce species of equal value to some of those already described and in our lists. It is perfectly legitimate to describe apparent new forms, but they should be

considered tentative only, and when the intervening gradational forms are found the true value of the new form should be recognized. The trouble with which we have to contend in such cases is that if we revise the work of others we are very apt to make them our enemies, and unpleasant controversies arise.

It has been said that there is no such species as *Papilio ajax* but the forms *walshii*, *abbotii*, *telamonides* and *marcellus*, which together make the species *ajax*. I do not object to this so long as the relationship is made apparent, but I would consider it entirely wrong to list these as distinct or specific names. The fault I find with our lists is that there is no exact comparative value among our so-called species. In one instance relationship may be thus indicated, and in other cases parallel value or relationship has not been so recognized.

I now propose to take a glance at our species and give some opinions as to their comparative value. I do not say that my ideas always represent exact facts, but I think they will incline toward the truth and indicate what lines of study may be taken up in this contention. I do not mean to be hypercritical toward the work of our American students, as their work equals that done in any part of the globe. Moreover I do not see how any one can suppose that the naming of a new species indicates the value for all time, as names are only tentative until proven absolute, as far as the doctrine of evolution will allow.

In our own country we have the wonderful effect of vertical distribution, seasonal changes, differences of soil, climate, food, geology and, in fact, everything which suggests itself in this connection. In the genus *Papilio* we have twenty-six named as entitled to specific rank. Of these twenty-six nine are of doubtful value in varying degrees and I would arrange them thus, *thoas*, *pergamus*, *hollandii*, *brucei*, *nezahualcoyotl*, *oregonia*, *nitra*, *rutulus*, *brevicauda*, those of least value being mentioned first and the rest following in order given. *Thoas* is a synonym of *cresphontes*, *pergamus* of *indra*. *Rutulus* is probably a horizontal race of *turnus*, and was described as such by its author Boisduval. I have a specimen of *Papilio* taken here (Philadelphia) that would pass as *rutulus*. I believe a sufficient number of specimens of *turnus* and *rutulus* representing geographical distribution would prove their identity. I may say right here that I believe the imago the culmination of nature's effort, and that while studies of transformation are most valuable they will not solve the problem of specific difference or identity. It would take too much space to go into details in regard to all these, and I will only give opinions in most instances. *Brevicauda*

would also have to be studied from the standpoint of distribution. *Nezahualcoyotl* is the *brevicauda* of *philenor*. Do some of these forms differ any more from their nearest allies than the extremes of the vertical distribution of *turnus*? Take, for instance, the Arctic form or the form from wintering chrysalids in this locality (Philadelphia). I have two females of *turnus*, one from Philadelphia and the other from Florida. One expands 3 inches and the other 6; the Florida example thus having a greater expanse of 3 inches. They differ as markedly in other ways, the Southern form being a rich orange and the local one almost white.

I have nothing to say about our species of *Parnassius*, except that I doubt that the true *nomion* has been taken in North America.

In *Pieris* we have ten species, and of these I consider three of doubtful value—*nelsoni*, *virginiensis* and *occidentalis*. The putting *virginensis* as a var. of *napi* and also as a species was probably the work of the printer's devil. Looking at the list and seeing var. *vernalis* of *protodice* reminds me of the fact that all butterflies to a greater or less extent differ in the spring or generation from wintering chrysalids, from those produced from eggs of the first, and if seen fit all should be called *vernalis*. Thus the spring generation of the Himalayan *Papilio polyctor* is called variety *vernalis*, and properly so, but the spring generation of *Pieris occidentalis* is called *calyce*. Would it not be better to call all spring variations the variety *vernalis* of the different species where the spring generation is different from subsequent broods. Some of the varietal names of species of *Pieris* are also synonymous of forms found in Europe. For instance, in Alaska we have var. *bryoniæ* of *napi*, of which I believe *hulda* is a synonym.

In *Anthocharis* we have fifteen species. Of these *flora*, *rosa*, *reakirtii*, *thoosa*, *stella*, *julia*, *hyantis* and *morrisonii* are of doubtful value. *Rosa* seems to be the same, or at best a var. of *olympia*. I should say it represented the southern end of the vertical distribution. *Reakirtii*, I believe, has been proven to be the *vernalis* of *sara*. *Thoosa* is probably the female of *cethura*. *Julia* and *stella* are slight modifications of var. *reakirtii*. *Flora* is a distribution modification of *sara*. *Hyantis* is probably a brood variation of *ausonides*. *Sara* and *reakirtii* both have interesting dimorphic females, one yellow, the other white.

In *Callidryas*, *sennæ* will probably be proven to be a synonym of *eubule*. In *Kricogonia* we have four species and a variety, and I believe them to be all one thing.

In the genus *Colias* much good could be done by obtaining collections from various localities, with proper data. We have in this

genus twenty species. Of these we have *harfordii*, *moina*, *alexandra*, *edwardsii*, *emilia*, of doubtful value. Now, in regard to *hecla*, *meadii* and *elis*, we know them from Greenland and Iceland, Laggan and Colorado, but do we know that they are not found over the intervening territory, and do we know that if they are thus found they would not show intergrades or evidences of the effect of vertical distribution? The Lapland *hecla* is quite different from the Greenland one, and shows as much difference as some of our so-called species. *Danais strigosa* is likely to prove a variety of *berenice*.

In the genus *Argynnis* we have fifty-eight species, of which about eighteen are of doubtful value. I have a large amount of specimens with proper data and the more I get the less I know in one direction (in relation to species as listed) and the more in regard to the real value of variation. The wonderful and interminable variation in this genus has already been pointed out. The presence or absence of silver spots below is in many species of no value whatever, and my studies would lead me to believe that an unsilvered form always has a silvered form, of regular or irregular appearance, except in a few such species as *alberta*, *astarte*. We may also have hybrids each year which occur annually, yet, of course, do not actually reproduce their kind. The difference produced by vertical and horizontal distribution is tremendous. Take, for instance, *cybele* from Maine and Florida, the difference is fifty-fold greater than between *aphrodite* from Maine and *aphrodite* from Colorado (*cipris*). *Aphrodite* from Maine and from the mountains of North Carolina are also wonderfully different in size and maculation and really differ to a greater extent than some of the gradational forms listed as species. I am studying this interesting genus and will now point out so-called species which show gradational forms or have been proven one and the same thing. I have found white females of *cybele* like unto *leto* and would refer reader to Ent. News, Vol. V, p. 318.

We want to know more about *nitocris*, but can't do anything until we get more material. *Cipris* is the form of *aphrodite* found in Colorado. *Alcestis* I have, showing every intergrade into *aphrodite*. *Electa* is so close to *atlantis* as to hardly warrant a varietal name and differs no more than other local forms of *atlantis*. The one found at Nepigon is not exactly like either. The forms clustering around *monticola* and *rhodope* are legion, hardly any two being alike. *Chitone* has hardly any two individuals alike and there are all grades of silver spots beneath—from nothing to a silver mine. *Inornata* is probably an unsilvered form of some of the other known species. *Artonis* (unsilvered) has been taken in coitu with (*eurynome*) silvered, both ways,

female *artonis* and male *eurynome*, and male *artonis* and female *eurynome*. This is also true (I think) of the *eurynome* found in Alberta, N. W. T., and the unsilvered *clio*. There is no doubt about these being all one species, and we may possibly add to them *opis* and *bischoffi*, the latter representing the upper end of the vertical chain, it being the dark arctic form which we would naturally expect. We need more information about *columbia*, *hippolyta*, *semiramis*, *liliana*, *laura*, *rupestris*, *macaria*, *egleis*, *bellona* and *epithore*. *Carpenterii* is the Alpine form of *cybele* and it is of interest to know that it has been produced in Colorado and Arizona by altitude and in British America by latitude. A friend has recently told me he was sure he had seen the form *alcestis* flying with *aphrodite* in North Carolina. Some of our smaller species are also gradational geographical forms, as, for instance, *montinus*, *boisduvalii* and *butlerii* may also come in this category.

In regard to the *anicia* group of *Melitæa* I have the wisdom of Socrates, "I know that I know nothing; others know not even this." I have species, lots of them of value equal to those already described. *Wrightii* is the Southern form of *leanira*, and I have intergrades. Most of our specimens of *leanira* came from San Francisco and of *wrightii* from Los Angeles Co. Let us have the gradations from between. *Sterope*, *acastus*, *palla* and *whitneyii* are dangerously close. I should have said that *alma* is the desert form of *leanira*, and *fulvia* is very close to *alma*, if not the same. *Hoffmanni* I believe to be an aberration of *whitneyii*. *Perse* and *chara* are probably seasonal forms of one species. *Thekla* I take to be an aberration of *bollii*.

Phyciodes batesii needs investigation. I mistrust its specific value. *Camillus* is probably the central area form of *pratensis*. Mr. Edwards has established the identity of *Synchloë adjutrix* and *crocale* from the physiological standpoint (breeding). This had already been pointed out by Godman and Salvin from the morphological standpoint.

In *Grapta* the doubtful species are *hylas*, *rusticus* and *silvius*. *Silenus* looks like an occasional aberration. In the species of *Vanessa* and *Pyrameis* we have my idea of true species. *Junonia cœnia*, *genoveva* and *nigrita* are probably all one.

I have a large amount of material in *Apatura* and feel sure the species as listed will be reduced in number. I think the species of *Cœnonympha* as they now stand will be reduced at least one-half. Ocelli, spots and color are all of doubtful value as we now interpret them. My quotations from the English literature on the subject apply to our species also. I can see but one species in *Hipparchia ridingsii* and *dionysius*.

Satyrus needs study and revision, and I do not care to say much about them now, only that *ariane* has almost less than varietal value. Mr. Edwards has published a most interesting and instructive account of the species of *Chionobas* found in California, Oregon and Vancouver. He shows that these forms differ slightly and also shows that in the certain localities where they have been taken (where collectors are accidently found) the characters of the localities are different. He also says they are not found in the intervening territory. Now from my point of view I would not expect them to be the same if taken many miles apart, but would expect to find certain differences of less than specific value. The part of his argument which does not seem to me to be conclusive or proven is the alleged fact that the forms are not found in the intervening territory. I think they are probably found in places and that they would show the gradational, geographical, vertical, distributional differences seen in all Lepidoptera. I know this to be absolutely true of other species occurring in Oregon and Vancouver, and that they differ as much if not more than do *Chionobas californica* and *gigas*. This is true, for instance, of *Parnassius clodius*. Are we, therefore, to give one of these forms a new name? Of the *semidea* group I have nothing to say at present. *Libythea bachmani* and *carinenta* I believe to be one species, *larvata* probably being a variety of the latter form. *Carinenta* differs from its more northern representative in the same way as many other butterflies found North and South—for instance, like *Pamphila* var. *egeremet* and *otho*. *Lemonias mormo*, *duryi*, *cythera* and *virgulti* need investigation both geographically and in regard to seasonal broods. *Calephelis* species are open to some doubt. *Thecla* and *Lycæna* need study badly, also from the geographical and seasonal standpoints, especially the latter. All Lycænidæ should have on pin *exact date of capture* as well as exact locality. *Melinus* is a species of great variability and found all over the United States; it is the same thing whether from Maine, Vancouver, Florida or Arizona—the same tune but with variations. There are too many to mention, and I am sure there will be a certain amount of dropping in values.

In *Chrysophanus*, on a guess, I should say *arota* and *virginiensis* were perhaps seasonal differences and *xanthoides* and *dione* differ because the one is found in California and the other in Iowa. *Florus* would seem to be a variety of *helloides*, if it is not the *dorcas* of Kirby. The Greenland *hypophlæas* differs wonderfully from Pennsylvania specimens, and is more entitled to specific value than is *sirius*, the more Eastern *rubidus*. The one shows the vertical differences and the other the hori-

zontal effects of distribution. I am studying the genus *Lycæna* and think many names will eventually have the same value as those under *pseudargiolus*, of which we now have nine names. They represent what many of the others will in the future—gradational geographical forms and seasonal variations. When people put date and locality on the pins we will be able to find out these things. I have expressed my views in regard to *Pamphila*. See Can. Ent., Vol. XXVII, p. 261. The variations of *comma* should not be entitled to specific value. The species in *Nisoniades* are in bad shape and need careful study. I believe we have some synonyms among them. The species of *Aegiale* are interesting, and may be modifications produced by season, condition of food plant, etc. *Neumoegeni* is a very distinct species. The others are more nearly related.

DESCRIPTION OF THE LARVÆ OF SOME HETEROMEROUS AND RHYNCHOPHORUS BEETLES.

(Plate IV, Figs. 1–6)

BY H. F. WICKHAM.

The following descriptions have been written for the sake of making known to American students the immature stages of some of our beetles. In view of how little has been done in this country, it will not surprise most Coleopterists to hear that they all belong to genera in which none of the species peculiar to our continent have yet been studied in the larval state.

Nearly all of the details are from camera-lucida drawings of balsam mounts; they are, however, not all on the same scale, being made from time to time as leisure offered and with different instruments.

Megeleates sequoiarum *Casey*. (Fig. 1.)

Larva cylindrical, elongate, tapering slightly to each end. Color in spirits yellowish, head somewhat darker, mouth parts castaneous. Length 16 mm. Head barely perceptibly narrower than the prothorax, sides rounded, front nearly vertical, flattened. A distinct ridge runs down on each side of the frontal declivity to the base of the mandibles. The ocelli are situated on the upper or posterior portion of this ridge and are connected with each other by a transverse, very tortuous raised line. Antennæ situated exterior to the mandibles, apparently four-